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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,336	06/30/2003	Upendra V. Chaudhari	YOR20030043US1 (590.105)	3723
35195 7590 04/24/2008 FERENCE & ASSOCIATES LLC 409 BROAD STREET PITTSBURGH, PA 15143				
EXAMINER WOZNIAK, JAMES S				
ART UNIT 2626		PAPER NUMBER		
MAIL DATE 04/24/2008		DELIVERY MODE PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/611,336

Applicant(s)

CHAUDHARI ET AL.

Examiner

JAMES S. WOZNAK

Art Unit

2626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 January 2008.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-17 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 30 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/5508)
4) ☐ Interview Summary (PTO-413)
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____
Paper No(s)/Mail Date _____

DETAILED ACTION

Response to Amendment

1. In response to the Final Office Action from 9/28/2007, the applicant has submitted a request for continued examination, filed 1/28/2008, amending independent claims 1, 8, and 15, and arguing to traverse the art rejection based on the amended claim limitations (*Amendment, Pages 10-11*). The applicants' arguments have been fully considered, however, the previous rejection is maintained due to the reasons listed below in the response to arguments section.
2. In response to the amended claims, the previous 35 U.S.C. 112, first paragraph rejection has been withdrawn.
3. In response to the amended claims, the previous 35 U.S.C. 101 rejection has been withdrawn.

Response to Arguments

4. Applicant's arguments have been fully considered but they are not persuasive for the following reasons:

With respect to the independent claims, the applicants argue that Rahim (*U.S. Patent: 5,960,397*) fails to teach the invention as claimed because the base model system in the present

invention is switched to best match the environment while the second level model and classifier remains unchanged, which allows for a single enrollment of a target class. The applicants also argue that the target classifier is a stacked model and uses likelihoods produced by the base system as input features, which is it argued, is not taught by Rahim (*Amendment, Pages 10-11*).

In response, the examiner notes that in Rahim, the base model and the stacked target model are independent. More specifically, Rahim first teaches a second stage environmental classifier for use in the model adaptation process (*Col. 6, Lines 31-46*). Rahim also teaches a set of base models not assigned to particular acoustic environments (*Col. 8, Lines 11-22*). The base models and classifiers are maintained independently in separate storage areas (*Fig. 1, Elements 20 and 22*). Thus, the base models and classifiers are independent. Further, the target model (*i.e., speech recognition model adjusted for a particular speaker's acoustic environment*) in Rahim is a stacked target model because the obtained model represents a base model vector space projected or stacked upon a target vector space (*Col. 8, Line 59- Col. 9, Line 6*). The base model is only adapted for a test utterance to generate the stacked target model and is not permanently altered (*Col. 8, Lines 11-22; and Col. 10, Lines 55-56*), and thus, is independent from the stacked target model. Additionally, these stacked target models are obtained during test and allow a single set of enrolled classifier data to be used for each target environment (*one model for each environment is needed, Col. 7, Lines 41-55*). Thus, the teachings of Rahim read on the current broad claim scope.

The examiner does note, however, that there may be potential differences in the applicants' disclosure and the teachings of Rahim. In the response, the applicants' explain how their process is utilized for speaker verification (*Amendment, Pages 8-9*) and begin to generally

explain how likelihoods produced by a base system are used as input features in a target classifier (*Amendment, Page 11*). These limitations are not found in the claims. Thus, it is recommended that the claims be amended to better indicate how the base model, environment detector, and transform arrangement work together to adapt a speaker identification model into an environment that is not trained for that particular speaker. The examiner has further provided references directed toward the concept of data fusion, which have been provided to the applicants for their consideration with respect to any potential claim amendments.

The art rejection of dependent claims 2-7, 9-14, and 16-17 is traversed for reasons similar to the independent claims. In regards to such arguments, see the response directed towards the independent claims.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. **Claims 1-7 and 16** are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: the relationship between the input arrangement and the other elements of the invention.

7. **Claims 8-15 and 17** are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: the steps connecting the pattern input step to the other method processes.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. **Claims 1-17** are rejected under 35 U.S.C. 102(b) as being anticipated by Rahim (*U.S. Patent: 5,960,397*).

With respect to **Claims 1 and 8**, Rahim discloses:

An input arrangement which input features (*receiving input speech features, Col. 5, Lines 31-42*);

A base model provision arrangement which provides at least one base model (*base models, Col. 8, Lines 11-22; and Fig. 1, Element 20*);

An environment detector which ascertains an environment from which the at least one base model originated (*classifier that identifies an acoustic environment of a training model, Col. 5, Lines 53-60; Col. 6, Line 31- Col. 7, Line 55; Fig. 1 Element 18*); and

A transform arrangement which produces a stacked target model based on a feature vector corresponding to the environment from which the at least one base model originated (*model transform based on a model from an particular environment, wherein model parameters in a vector space, or vectors, are utilized, Col. 6, Lines 1-14; Col. 8, Lines 11-22; and Col. 8, Line 59- Col. 9, Line 22*), wherein there is independence between the at least one base model and the stacked target model allowing for a single enrollment of a target class (*obtained model representing a base model vector space projected or stacked upon a target vector space (Col. 8, Line 59- Col. 9, Line 6); base model is only adapted for a test utterance to generate the stacked target model and is not permanently altered (Col. 8, Lines 11-22; and Col. 10, Lines 55-56); stacked target models obtained during test that allow a single set of enrolled classifier data to be used for each target environment (one model for each environment is needed, Col. 7, Lines 41-55)*);

Wherein the apparatus produces a pattern recognition decision (*Fig. 1, recognized speech signal*).

With respect to **Claims 2 and 9**, Rahim further discloses:

The apparatus is adapted to perform speech recognition (*speech recognition, Col. 6, Lines 15-22*) and said input arrangement is adapted to input linguistic features (*input speech features, Col. 5, Lines 31-42, which correspond to word portions, Col. 1, Lines 16-20*).

With respect to **Claims 3 and 10**, Rahim further discloses:

The base model provision arrangement is adapted to build a pool of base models (*plurality of models corresponding to different acoustic environments, Col. 7, Lines 41-5*).

With respect to **Claims 4 and 11**, Rahim further discloses:

The base models are Gaussian Mixture Models (*GMMs*, Col. 6, Lines 41-46).

With respect to **Claims 5 and 12**, Rahim further discloses:

The environment detector is adapted to express the closeness of a set of at least one input feature to a given base model (*identifying the acoustic environment of unknown speech*, Col. 5, Lines 53-60).

With respect to **Claims 6 and 13**, Rahim further discloses:

The feature vector represents at least one likelihood associated with at least one input feature in a given environment (*likelihood associated with identifying an acoustic environment corresponding to input speech features*, Col. 5, Lines 9-21).

With respect to **Claims 7 and 14**, Rahim further discloses:

The environment detector is adapted to inform the production of the feature vector in correspondence with the environment from which the at least one base model originated (*determining and providing the most similar model to input speech features for model adjustment*, Col. 10, Lines 10-38).

With respect to **Claim 15**, Rahim discloses the system and method for model adaptation, as applied to claims 1 and 8, as software stored in a ROM (Col. 4, Lines 38-59).

With respect to **Claims 16-17**, Rahim further discloses:

Cascading of two model levels is utilized for channel mismatch compensation (*model adaptation for channel mismatch (i.e., channel distortion and acoustic transducer effects) that overlaps or projects sequences of model spaces*, Col. 2, Lines 26-39 and Col. 8, Line 59- Col. 9, Line 6).

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: See PTO-892.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James S. Wozniak whose telephone number is (571)272-7632. The examiner can normally be reached on M-Th, 7:30-5:00, F, 7:30-4, Off Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on (571) 272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James S. Wozniak/
James S. Wozniak
Patent Examiner- AU 2626